ETUOIKEUSTODISTUS
PRIORITY DOCUMENT

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Kansainvälinen patenttihakemus nro
International patent application no **PCT/FI98/00653**

Kansainvälinen tekemispäivä
International filing date   **25.08.1998**

Etuoikeushak. nro
Priority from appl.   **FI 973528**

Tekemispäivä
Filing date   **27.08.1997**

Keksinnön nimitys
Title of invention

**"Procedure for accessing a service in a data communication system,
and a data communication system"**

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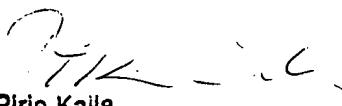
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REQUEST

The undersigned requests that the present
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International Application No. **PCT/FI 9 8 / 0 0 6 5 3**

International Filing Date **2 5 AUG 1998** (2 5. 08. 98)

**The Finnish Patent Office
PCT International Application**
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) **10686S**

Box No. I	TITLE OF INVENTION	PROCEDURE FOR ACCESSING A SERVICE IN A DATA COMMUNICATION SYSTEM, AND A DATA COMMUNICATION SYSTEM

Box No. II   APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

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Box No. VI   PRIORITY CLAIM

☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application *(day/month/year)*	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 27 August 1997 (27.08.97)	973528	FI		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): _____

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Box No. VII   INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*	Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*
ISA / SE	Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII   CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	:	4
description (excluding sequence listing part)	:	9
claims	:	4
abstract	:	1
drawings	:	
sequence listing part of description	:	
Total number of sheets	:	**18**

This international application is accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☒ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
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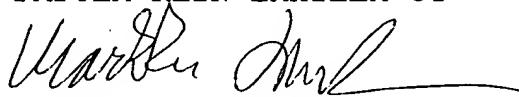9. ☐ other *(specify)*:

Figure of the drawings which should accompany the abstract:	Language of filing of the international application:	English

Box No. IX   SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

PAPULA REIN LAHTELA OY

Markku Simmelvuo

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1. Date of actual receipt of the purported international application:	2 5 AUG 1998 2 5 -08- 1998	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		☐ received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):		☐ not received:
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PROCEDURE FOR ACCESSING A SERVICE IN A DATA COMMUNICATION SYSTEM, AND A DATA COMMUNICATION SYSTEM

The present invention relates to a procedure as defined in the preamble of claim 1. Moreover, the invention relates to a system as defined in the preamble of claim 6.

Reliable user identification is a prerequisite for the use of many services provided in the general telecommunication network or in other data networks. Such services include e.g. bank services. The service may involve significant economic effects and therefore the service provider wants to ascertain the user's identity before making the service available.

Very often, e.g. in conjunction with bank services, the user is identified by means of passwords. Usually these passwords are expendable. The service provider or an identifying party authorised by the service provider has given the user beforehand a number of passwords (e.g. four-digit numbers), one of which the customer uses each time he/she needs the services. When a list of passwords is about to be exhausted, the service provider (or a party authorised by the service provider) sends the user a new list of passwords. Thus, the user always has a sufficient number of passwords for his/her needs in the near future.

A feature typical of prior-art solutions is that the customer has to manually input an expendable password when logging on to a server. Often the password is entered by pressing the keys of a telephone set, causing the data to be transmitted to the server using tone frequency transmission, so-called DTMF (dual tone multifrequency) codes. In addition, there are many other methods for transmitting a password, such as the short-message service in the GSM network (GSM, Global System for Mobile Communications; in the present description, GSM network refers to any mobile communication system based on the GSM specifications).

However, the essential point is that the user has to manually input the password him/herself. This is in many cases quite difficult for the user.

Another feature typical of prior-art solu-
5 tions is that the service provider must send a new set of passwords by using a rather unreliable transmission mechanism. The most commonly used method is to send them by mail. The problem is that the letter contain-ing the passwords may end up in the wrong hands.

10 The object of the present invention is to eliminate the problems described above.

A specific object of the present invention is to disclose a completely new type of procedure and system for transmitting passwords between a user's
15 telephone apparatus and a server.

A further object of the invention is to fa-cilitate the use of services requiring passwords by reducing the number of routines necessitating user in-teraction in conjunction with the use of the services
20 without making any compromises in regard of safety of the services.

The procedure of the invention is character-ised by what is presented in claim 1. The system of the invention is characterised by what is presented in
25 claim 6.

In the procedure of the invention for access-ing a service in a data communication system, in which the service provider gives the user of a service a number of expendable passwords by means of which the
30 user can access the service via a telecommunication and/or data network, a connection is set up from a terminal device to a server and a password is sent at log-on to the service, the password is identified and access to the service is allowed and/or denied based
35 on the password supplied.

According to the invention, in the procedure, a set of passwords are stored in the terminal device,

the right password is selected from the stored set of passwords at log-on to a predetermined service, and the password is automatically added to a connection setup signal to be transmitted from the terminal de-
5 vice to the server.

Correspondingly, in the system of the invention, the terminal device comprises means for storing a set of passwords and selecting the right password from the stored set of passwords at log-on to a prede-
10 termined service to allow automatic addition of the password to a connection setup signal to be transmitted from the terminal device to the server.

The invention has the advantage that it discloses a completely new type of mechanism for the
15 transmission of passwords between a user's telephone apparatus and a server. A further advantage of the invention is that it facilitates the use of services requiring passwords by reducing the number of routines necessitating user interaction in conjunction with the
20 use of the services. This is done without any compromises regarding the safety of the services.

In an embodiment of the procedure, the used ones of the passwords in a set of passwords are registered.

25 In an embodiment of the procedure, the set of passwords in the terminal device is updated from the server via the telecommunication and/or data network.

In an embodiment of the procedure, an order for a new set of passwords is automatically sent to
30 the server once the previous set of passwords has been exhausted.

In an embodiment of the procedure, several sets of passwords corresponding to different services are stored in the terminal device, and in connection
35 setup the set of passwords corresponding to the service to be accessed in each case is selected.

In an embodiment of the system, the terminal device comprises means for registering the used ones of the passwords in a set of passwords.

In an embodiment of the system, the server comprises means for updating the set of passwords in the terminal device via a telecommunication and/or data network, and the terminal device comprises means for receiving a set of passwords.

In an embodiment of the system, the terminal device comprises means for automatic ordering of a new set of passwords from the server after the previous set of passwords has been exhausted.

In an embodiment of the system, the terminal device comprises means for storing several sets of passwords corresponding to different services.

In an embodiment of the system, the terminal device comprises means for selecting the set of passwords corresponding to the service to be used in each case.

In an embodiment of the system, the data communication system comprises a wired network and the terminal device is a telecommunication terminal, such as a telephone, in the wired network.

In an embodiment of the system, the data communication system comprises a mobile communication network, such as a GSM network, and the terminal device is a mobile station, such as a GSM telephone.

In an embodiment of the system, the terminal device is a GSM telephone, and the means for using said password management functions are disposed in a subscriber identity module, such as a SIM card.

In an embodiment of the system, in the connection setup between the subscriber identity module and the server, the transmission of passwords is effected by making use of the called subscriber number.

In an embodiment of the system, the software means of the subscriber identity module are designed

to identify the service on the basis of its identifier data, such as the telephone number, and to add a number of additional digits forming a password to the end of the telephone number of the service during call

5   setup.

In an embodiment of the system, the subscriber identity module is provided with a service directory containing information specifying the services, the service identifier data and the names of the

10   password files to be used in conjunction with the services.

In an embodiment of the system, the service directory is provided with a pointer for each service, which pointer has been arranged to point to the first

15   unused password in the set of passwords and, after the password has been used, to move on to point to the next unused password in sequence.

In an embodiment of the system, the means for ordering new passwords and transmitting them between

20   the server and the subscriber identity module comprise the short-message service (SMS-PP service) of the GSM network.

In the following, the invention will be described in detail by the aid of an application exam-

25   ple.

The invention is based on providing the telephone apparatus with an extra module (physical or logical) allowing a functionality which creates additional signals in the communication between the tele-

30   phone apparatus and the server in conjunction with a connection setup related to a service and/or additional fields and/or components or equivalent in the communication between the telephone apparatus and the server, the expendable password being transmitted in

35   these additional signals/fields/components. This is done automatically without the user becoming aware of it. The module registers the passwords used each time

and therefore always knows which is the correct pass-
word to be used at log-on. The user will find this
type of services easier to use, but in respect of data
security they are of the same level with services in
5   which the user must input the passwords him/herself.
The extra module is also able to receive new passwords
from the server and it can even order new passwords
when necessary.

         The extra module in the telephone apparatus
10   may support simultaneous services requiring expendable
passwords. For this purpose, the extra module contains
a directory of services supported (in short, a service
directory), which is used to identify a service re-
quiring expendable passwords and to find the correct
15   list of passwords and also to find the correct posi-
tion in the list.

         The best embodiment of the invention is a mo-
bile station, such as a GSM telephone, whose sub-
scriber identity module contains an application that
20   uses SIM Application Toolkit commands to accomplish
the extra functionality described above. The password
transmission mechanism used in conjunction with the
setup of a service connection between the SIM card and
the server consists of the use of the called sub-
25   scriber number, i.e. the so-called B-identifier. The
application on the SIM card uses the `Call Control by
SIM' command as defined in the TS GSM 11.14 specifica-
tion, and in practice the application processes each
called subscriber number, in other words, it compares
30   the called subscriber number with the numbers stored
in the service directory, and when it detects that the
call is addressed to one of the stored numbers, it ap-
pends to the end of the telephone number a required
number of additional digits in which the expendable
35   password is encoded. For example, when the user is
making a call to the number 0800-XYZ-123456, the ap-
plication on the SIM card will change the number to

the form 0800-XYZ-123456-KLMN. The last four digits
(KLMN) of the modified number are the expendable pass-
word added by the SIM card.

The service directory may be implemented as a
5   special file on the SIM card. The special file con-
tains information specifying the services supported,
their identifier data and the names of the password
files to be used in conjunction with the services.
Moreover, for each service, the service directory con-
10 tains a pointer that points to the current position in
the list of passwords. Table 1 presents an example of
the information elements contained in the special
file.

For example, service 1 is identified from the
15 fact that the user is calling the number 0800123. The
application knows that it has to append to the end of
the number an expendable password, which is found in
the file 2FF5. In this instance, the password to be
used is the thirteenth one in this file.

20

Service identifier	Method	Identifiers associated with method	Name of password file	Pointer	Total number of passwords
1	BID	0800123	2FF5	13	100
2	BID	0800456	2FF4	11	100
3	SMS	SMSC:+02 0202800 BID:8756	2FF6	2	9

Table 1. Service directory as used in an em-
bodiment of the invention.

25 The server in the public telecommunication
network receives the expendable password in the sig-
nalling in the telephone network. The server takes the
last four digits of the B-identifier and assumes that
they constitute an expendable password. The server

compares the expendable password thus obtained with
its own information as to the user's next password.
This is done by methods already known at present.

If the service requires the use of a user
name at log-on to the service, the service directory
may contain stored user names for each service. The
user name can be appended to the connection setup sig-
nal in the same way as the password.

For the transmission of new passwords between
the server and the application of the invention on the
SIM card, it is possible to use the SMS-PP service of
the GSM network. If the SIM card sends an order for
new passwords, this is effected using the SMS-PP/MO
(Mobile Originated) service and the passwords are
transmitted to the SIM card using the SMS/PP-MT serv-
ice.

The functionality of the application is di-
vided between three blocks. The first block, an ap-
pending block, recognises the need to add an expend-
able password and sends a request to find the password
to a password search block. Once the search block has
found the right password, the appending block appends
the expendable password it has received to the B-
identifier and allows the call to proceed further from
the telephone apparatus.

In the best embodiment of the invention, a
block for adding new passwords works completely inde-
pendently of the other blocks. In practice, it moni-
tors the SMS Data Download traffic consistent with TS
GSM 11.14 version 5.1.0 received by the SIM card and
detects the appearance of new passwords on the card.
The block for adding new passwords stores the new
passwords received in the SMS Data Download message to
a suitable special file on the SIM card and makes an
appropriate addition to the service directory so that
the search block will be able to find the new pass-
words. This new password file may be a combination

that contains the last unused passwords of the previous file and the completely new passwords just received.

The invention is not restricted to the application example described above, but many variations are possible within the scope of the inventive idea defined by the claims.

CLAIMS

     1. Procedure for accessing a service in a data communication system, in which the user of the service is given a set of expendable passwords that the user can use to access the service via a telecommunication and/or data network, and in which procedure a terminal device is used to set up a connection to a server and a password is sent at log-on to the service, the password is identified and access to the service is allowed/denied based on the password supplied, c h a r a c t e r i s e d in that

     a set of passwords is stored in the terminal device,

     the right password is selected from the stored set of passwords at log-on to a predetermined service, and

     the password is automatically added to a connection setup signal to be transmitted from the terminal device to the server.

     2. Procedure as defined in claim 1, c h a r a c t e r i s e d in that the used ones of the passwords in a set of passwords are registered.

     3. Procedure as defined in claim 1 or 2, c h a r a c t e r i s e d in that the set of passwords in the terminal device is updated from the server via the telecommunication and/or data network.

     4. Procedure as defined in any one of claims 1 - 3, c h a r a c t e r i s e d in that an order for a new set of passwords is automatically sent to the server once the preceding set of passwords has been exhausted.

     5. Procedure as defined in any one of claims 1 - 4, c h a r a c t e r i s e d in that several sets of passwords corresponding to different services are stored in the terminal device and, during connection setup, the set of passwords corresponding to the service to be accessed in each case is selected.

6. Data communication system in which the user of a service is given a set of expendable passwords that the user can use to access the service via a telecommunication and/or data network, said system
5 comprising
- a user's terminal device provided with means for sending a password at log-on to the service,
- a server to which the terminal device sets up a connection, said server comprising means for
10 identifying the password and for allowing/denying access to the service on the basis of the password supplied, c h a r a c t e r i s e d in that the terminal device comprises means for storing a set of passwords and selecting the right password from the stored set
15 of passwords at log-on to a predetermined service to allow automatic addition of the password to a connection setup signal to be transmitted from the terminal device to the server.

7. System as defined in claim 6, c h a r -
20 a c t e r i s e d in that the terminal device comprises means for registering the used ones of the passwords in the set of passwords.

8. System as defined in claim 6 or 7, c h a r a c t e r i s e d in that the server comprises
25 means for updating the set of passwords in the terminal device via the telecommunication and/or data network, and that the terminal device comprises means for receiving a set of passwords.

9. System as defined in any one of claims 6 -
30 8, c h a r a c t e r i s e d in that the terminal device comprises means for automatic ordering of a new set of passwords from the server after the previous set of passwords has been exhausted.

10. System as defined in any one of claims 6
35 - 9, c h a r a c t e r i s e d in that the terminal device comprises means for storing several sets of passwords corresponding to different services.

11. System as defined in claim 10, c h a r - a c t e r i s e d in that the terminal device comprises means for selecting the set of passwords corresponding to the service to be used in each case.

5   12. System as defined in any one of claims 6 - 11, c h a r a c t e r i s e d in that the data communication system comprises a wired network and the terminal device is a telecommunication terminal, such as a telephone, in the wired network.

10   13. System as defined in any one of claims 6 - 12, c h a r a c t e r i s e d in that the data communication system comprises a mobile communication network, such as a GSM network, and the terminal device is a mobile station, such as a GSM telephone.

15   14. System as defined in any one of claims 13, c h a r a c t e r i s e d in that the terminal device is a GSM telephone, and that the means for using said password management functions are disposed in a subscriber identity module, such as a SIM card.

20   15. System as defined in claim 14, c h a r - a c t e r i s e d in that, in the connection setup between the subscriber identity module and the server, the transmission of passwords is effected by making use of the called subscriber number.

25   16. System as defined in claim 14 or 15, c h a r a c t e r i s e d in that the software means of the subscriber identity module are designed to identify the service on the basis of its identifier data, such as the telephone number, and to append a number 30 of additional digits forming a password to the end of the telephone number of the service during call setup.

       17. System as defined in any one of claims 13 - 16, c h a r a c t e r i s e d in that the subscriber identity module is provided with a service directory 35 containing information specifying the services, the service identifier data and the names of the password files to be used in conjunction with the services.

18. System as defined in claim 17, c h a r -
a c t e r i s e d in that the service directory is pro-
vided with a pointer for each service, which pointer
has been arranged to point to the first unused pass-
5   word in the set of passwords and, after this password
has been used, to move on to point to the next unused
password in sequence.

19. System as defined in any one of claims 13
- 18, c h a r a c t e r i s e d in that the means for
10   ordering new passwords and transmitting them between
the server and the subscriber identity module comprise
the short-message service (SMS-PP service) of the GSM
network.

(57) ABSTRACT

The invention relates to a procedure and a data communication system in which a service provider gives the user of a service a set of expendable pass-
5 words that the user can use to access the service via a telecommunication and/or data network. The system comprises a user's terminal device provided with means for sending a password at log-on to the service, and a server to which the terminal device sets up a connec-
10 tion and which comprises means for identifying the password and for allowing/denying access to the serv-ice on the basis of the password supplied. The termi-nal device comprises means for storing a set of pass-words and for selecting the right password from the
15 stored set of passwords at log-on to a predetermined service to allow automatic addition of the password to a connection setup signal to be transmitted from the terminal device to the server.